A PROJECT REPORT

ON

A CONVERSATIONAL AI COMPANION FOR PHYSICAL AND PSYCHOLOGICAL WELLNESS

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BY

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ABSTRACT

Requirement elicitation is one of the most crucial processes for developing any kind of software. This process identifies the various stakeholders, features and functionalities of the software. So far we have seen the stakeholders, feasibility and some of the requirements for the given problem statement. This article dives deep into the problem statement and explains more in detail about the functional requirements and the non-functional requirements. It also lists out the primary features of the software the working of which is supported by a few UML diagrams. This article also mentions the importance of requirements management tools and identifies the most suitable tool needed for this project.

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Chapter 1

Introduction

1.1 Introduction

Artificial Intelligence is now a promising field of technology that can promote healthy and effective lifestyle changes while reducing the need for in-person training and appointments. With the increasing usage of digital watches and fitness trackers for overall well being the only barrier for a healthy lifestyle is the lack of commitment and the over usage of electronic gadgets. To overcome this barrier we proposed software that can be installed on any gadget or be coupled to a wearable device with a sensory tracker which will automatically lock out the users of their respectable devices or laptops during a scheduled time and can only be activated again through the data collected from the tracker while doing the prescribed or planned workout. Thus far we have seen the feasibility study, identified stakeholders, analyzed the various methods of requirements elicitation and identified and used the best method to elicit the requirements of this particular project. This report now deals with the functional and non-functional requirements of the project, the most vital features that are needed and the supportive UML diagrams that help in understanding the working of the software. It also mentions the importance of using requirements management tools and explains about one such tool named Caliber along with its features that makes it the most suitable tool for managing the requirements of this project

Our AI companion can be installed on any gadget and can be coupled to a wearable device with a sensory tracker. Once the AI companion software has been installed and set up the users can schedule a reminder for their workout interval. During the scheduled time, the users will be automatically locked out of their respectable devices or laptops. The users are then required to do the physical activity that they set for themselves or do any activity from the list provided by the companion. During the activity session, a sensor on their wearable device collects their cardio data

and is sent to the software installed on the laptop through the internet or Bluetooth connection. This data unlocks the device so the users can resume their work again. The AI companion can work as a chatbox reminding the users of their upcoming schedules and give feedback on the user-logged meals and activities.

The whole idea of using an AI companion indicates human-computer interaction at a very fundamental level. If our method brings about the increased physical activity as it aims, the results would prevent illness, control chronic medical conditions, prevent depression and offer various other health benefits. In addition to personal benefits health cost expenditures can also be reduced. Studies on fitness-related technology have been measuring their physiological effects in a controlled environment, our AI companion allows us to track home-based utilization of ongoing fitness strategy and lifestyle. The workflow here would be unique and customized for each user according to their lifestyle preferences.

1.2 Problem Statement

Majority of adults in industrialized countries do not exercise frequently and the ongoing pandemic is forcing people to work from home which makes them miss several day-to-day physical activities that are required to sustain physical health. Sticking to a work out schedule and maintaining a balanced diet can be challenging as most of the people are confined at home surrounded by potential hindrances which include laziness, lethargy, work schedule, irregular sleep schedule, social media, streaming websites and boredom eating. We intend to solve this problem with the help of an AI assistant. Existing solutions like commercial games with an exertive interface called exergames that makes the player dance and do other physical activities have been proposed as solutions to increase activity levels but these games are seen as entertainment only and are not widely used by the older generation of people. Additionally, even though various technologies are being used to collect and maintain health care records, patient-centred care and direct interactions that result in positive outcomes are not widely implemented. Artificial Intelligence is now a promising field of technology that can promote healthy and effective lifestyle changes while reducing the need for in-person training and appointments.

Chapter 2

Feasibility Study

A feasibility study helps in identifying critical points required for the project and also estimates the project completion time. A feasibility study provides management with enough information to decide, Whether the project assigned can be done

- Whether the project assigned can be done
- Can there be any alternative
- Whether the project developed meets the customers' requirements

There are four types of feasibility studies. Those are the legal feasibility, operational feasibility, technical feasibility, economic feasibility and scheduling feasibility. Below we will show how these four feasibility studies are being examined.

2.1 Legal Feasibility

Legal feasibility checks the legal and ethical requirements needed to make a project successful. In this software, it can be a contract between two parties, the provider of services and the end customer. Some of the regulations for a software project would include the following

- Software license agreement
- Data protection legislation
- Project liability
- Copyright laws
- Patent laws
- Data privacy laws

2.1.1 Regulations

Regulations in our software would include data privacy laws and data collection laws that have to be followed for ethical functioning of the software and to maintain an ethical customer relationship

2.1.2 Safety

Recent advancements in Artificial intelligence has made it a part of everyone's life. Since this assists our lifestyle and records our data, sensitive data is prone to be stolen but are protected by legal laws. Since this deals with fitness general physical safety is also a factor to be considered seriously

2.2 Technical Feasibility

Technical Feasibility is more involved with the technical side of businesses and it checks the technical resources that are used to develop a particular system and also the technical resources needed to install, purchase or even operate the system to develop the product.

2.2.1 Accessibility

The use of artificial intelligence is increasing in many fields. In this pandemic situation, it reached a peak. It has reduced complexity and gave us more comfort. Its ultimate goal is to satisfy the customers' needs in a durable time.

2.2.2 Features

An AI assistant that builds personalised fitness and lifestyle plans based on user's goals, current fitness levels, eating habits, medical history and relevant data from devices like fitness trackers(eg. Fitbit). An additional feature is included here, the users have to do their assigned exercise for that particular day and the device will lock the user out. All their cardio data will be recorded by the sensor in the external device like Fitbit etc.

2.2.3 Connectivity

The details given by the user to the application will be end-to-end encrypted and stored in a cloud securely with reduced chances of data theft.

2.2.4 Software

The front end will be designed using HTML, CSS and other scripting languages; the backend uses NODE.JS and cloud for storage. Inbuilt sensors in the device are accessed through the application for movement detection.

2.3 Economic Feasibility

To determine whether a project is beneficial, logical and possible to execute, we do a cost-benefit analysis on the costs and revenues of the whole project. This analysis part reveals that the idea is economically feasible or not.

2.3.1 Manufacturing and Production Cost

The expense of manufacturing a device for the implementation of this software application is insignificant as this can be installed in mobile phones and laptops. We can connect an external device like a fit-band with the core device, which has sensors to detect movement and heartbeat. So the external device (optional) may cost around 1500 bucks.

2.3.2 Software Cost

This is the payment for the developer team who is a part of the stakeholders. This includes the front end and backend developers, design team, electronics and communication engineers, network engineers, etc.

2.3.3 Maintenance Cost

The maintenance cost is negligible for the hardware part as it comes under the warranty of the mobile phones and other devices. The software part will face some expenses for every update released by the developer team.

2.4 Operational Feasibility

2.4.1 Legal Regulations

There may be some restrictions in the ads which are going to be displayed in the application and the data privacy of the users. Other than that, we do not have any

legal restrictions in this product; this may be a boon to the developers. We use in-built sensors on the wearable devices to detect and record the movements and steps of the user. An additional sensor is present to track the heartbeat of the user, which confirms that the movement detected was due to the physical activities like walking, running, etc. The primary launch will contain a free version for fitness tracking. Future updates may introduce a paid version which will contain additional features.

Chapter 3

Stakeholders

Stakeholders are the group of people who have an interest in an organisation and its services and are directly or indirectly affected by the functionality of it. Stakeholders can have a positive or negative influence on the project and can be categorised into two types namely, Internal stakeholders and External Stakeholders. Stakeholders usually include employees, customers, shareholders, suppliers, communities, and governments.

3.1 Internal Stakeholders

Internal Stakeholders are the individuals who are directly involved in a project. The internal stakeholders for our project are listed below.

3.1.1 Owners

Owners (wherein publicly traded organizations can include shareholders) are the individuals who hold significant shares of the firm. Owners are responsible for the impacts the organization has, and play a huge role in strategy. Major decisions on internal and external stakeholders are made by the owners.

3.1.2 Employees

The employees are the ones who create and deliver the products or services that the customers need. Employees are primary internal stakeholders. Employees invest some money and a lot of time in the organization and play a defining role in the strategy, tactics, and operations the organization carries out.

3.1.3 Managers

Managers make final decisions about timeline, budget, and scope. They also manage a set group of employees and look over their team functionalities and help to maintain a healthy and ethical workplace

3.1.4 Developers

They build the software based on feedback from other stakeholders, but they're also stakeholders in their own right. They have the technical expertise necessary to advise executives on which features are feasible and how long each would take to build.

3.1.5 Investors

Investors embrace both shareholders and debtholders. Shareholders invest some principal amount within the business and expect to earn a profit thereon endowed capital. All alternative suppliers of capital, reminiscent of lenders and potential acquirers are enclosed here. All shareholders are inherently stakeholders, however the vice-versa isn't perpetually true.

3.1.6 Shareholders

A shareholder or stockholder is a person, company, or institution that owns at least one share of a company's stock, otherwise known as equity. Shareholders reap the benefits of a business' success because they are the essential owners of a company.

3.1.7 Board Members

The board of directors' or the board members are the shareholders who are usually elected to take care of the company's investment, stock and market growth. The board members meet at regular intervals to set policies for the management of the ongoing projects and oversee the future expandable areas.

3.2 External Stakeholders

External stakeholders are the target customers for whom the software was built. Thus they have the highest priority in all sense and the most influence over the long term success and the functionality of a project.

3.2.1 Customers

Customers are the end-users who rely on the company to provide a product or service. They support the company monetarily with each purchase they create, and every purchase additionally shows the company what product and services to take a position in further. information collected from the shoppers is often accustomed to improve and add expansions involving the services.

3.2.2 Communities

Communities are a group of people who share the same locality or interest and inturn use a project or a product within their group. When a big company has an influence over a small community, there is an immediate and significant impact on employment, incomes, and spending in the area. Communities here would be a group of users and personal trainers who help the company through various recommendations.

3.2.3 Partners

Partners here refers to third party individuals or companies whose input would be of prime importance to the project. Here partners would include manufacturers of sensory chips and other components who may or may not be directly involved in the project.

3.2.4 Suppliers

Suppliers and vendors are vital for revenue generation and on-going income. For our project, the suppliers would be the various app stores and software selling platforms that help us in reaching the customers by providing a digital outlet.

3.2.5 Government

Governments collect taxes from the company and benefit from the overall Gross Domestic Product (GDP) that companies contribute to. In India software development is subjected to many taxes both by the central and the state governments.

3.2.6 Organisations

Organizations are a group of stakeholders who play a major role in the reputation of a company. Here organizations may include various gym chains or fitness cults who

use and recommend the project to their customers.

3.2.7 Social Media

Social media plays an enormous role in reaching individuals. it's primarily their on-line face and temperament. it's typically what potential members initial act with. It conjointly plays into the habits of Millennials who tend to trust health and fitness news shared by their peers on social media.

3.2.8 Creditors

Creditors are the people and companies which have lent money, and now have a secured hobby in the company's worth. Creditors receive a commission from the sales of goods or services. Creditors consist of banks, suppliers, and bondholders.

3.3 Employee Roles

- **Software Develpoment**
  - UI / UX Designer
  - Software Architect
  - Software Engineer
- **Internet of Things**
  - IoT Embedded Architect
  - IoT Security Specialist
  - IoT Engineer / Specialist in IT
- **Mathematical Sciences**
  - Data Scientist
  - Applied Scientists
  - Algorithm Engineers
  - Machine Learning Engineer
  - Cryptanalytic Diagnostician
  - Applied Research Mathematician

- **Cloud Storage**
  - Cloud DevOps (IoT) Engineer
  - Cloud Application(IoT) Architect
  - DevOps Engineer - Docker/ansible/AWS
  - DevOps - Database Administrator
- **Network Security**
  - Network Vulnerability Analyst
  - Computer Network Operator
  - Network Defense Analyst
  - Security Analyst
- **Human Resources**
  - Benefits Specialist
  - Human Resources Professional
  - Human Resources Program Manager
- **Infrastructure and Logistics**
  - Facilities Manager
  - Facilities Services Officer
  - Logistics Supply Specialist
- **Management**
  - Risk leader
  - IT managers
  - Sales Manager
  - Financial Analyst
  - Project Manager
  - Marketing Managers
  - Operational Risk Manager
  - Compensation and Benefits Managers
  - Public Relations/Fundraising Manager

- **Training**
  - Instructional Designer
  - Virtual Training Specialist
  - Education and Training Program Manager
- **Healthcare**
  - Physician
  - Nutritionist
  - Fitness Expert
  - Yoga Instructors
  - Licensed Psychologist

"Get the right people. Then no matter what all else you might do wrong after that, the people will save you. That's what management is all about. "

-Tom DeMarco

Chapter 4

Requirements Gathering

4.1 Requirement Elicitation

Requirements elicitation is the process where we research and discover the system's requirements from the stakeholders. This process is also referred to as requirement gathering. But the term elicitation is preferred over gathering because good requirements just cannot be collected from the stakeholder, as indicated by the name requirements gathering. We cannot get all the requirements from the customer just by asking them what the product should do or not do; so requirements are non-trivial.

Requirements should be gathered through an elicitation process before they could be analysed, modelled and specified. It is a part of the requirements engineering process. The practice of requirement elicitation may appear simple, like asking the users for the objective of the product, what needs to be accomplished, how the product is going to be used on a day-to-day basis, etc., but many unidentified issues may occur which complicates the process.

According to developers, the requirement elicitation process is the most error-prone and the most communication intensive software development. This process needs an effective customer-developer understanding and partnership so that the real needs of the user can be figured out.

There are several elicitation techniques; the success of a technique depends on many factors like the genre of the project, users/customers, maturity of the analyst, etc.
Few of the elicitation techniques are:

- Document analysis

- Observation
- Interview
- Prototyping
- Brainstorming
- Workshop
- Joint Application Development (JAD)
- Reverse engineering
- Surveys/Questionnaire

4.2 Elicitation Technique

Sapiens are used to observing events in their lives, personally as well as professionally. We come to conclusions based on the observations we make. The elicitation technique used for this project is "Observation".

Clearly stated objectives guide an observation. The analyst must know the procedures like what data should be collected, how the observation will take place, when and where to observe, the method of data collection and the purpose of the data after analysis. Observation is first done during normal times and it will be repeated at peak times to get more detailed readings.

Observation is usually done with multiple tools to capture all important details. A tally sheet or a checklist is used during observation to note down the frequency of events. Other tools which are used for note-taking are video recorders, tape recorders, still-photography, note-taking tools, etc.

4.2.1 Justification

Since similar products exist in the current market and our objective is basically to build on the existing solutions and improve the process, observation technique is more suitable for requirements elicitation. Given the nature of our project, it is vital that we decipher the activities of our target audience by conducting an assessment of their environment. The factors like how the interaction takes place, how much time is spent on each activity, how people interrelate can help the analyst to familiarize

with the lifestyle and the working style of a particular group of people. Observation helps to sort out the regular from the irregular activities, look out for suggestions or opportunities, verify basic requirements and also discover instant requirements that can be considered for future functionalities. This method is also cost-effective and fulfils requirement elicitation in all the areas.

4.2.2 Pros

- This method provides a better understanding of the domain of application, the workflow, features required for the product and map it to the requirements specification.
- Observation is done on the physical location where the task is performed. So more information will be extracted like the physical layout, external noise or disturbances, accuracy of the readings of the device, etc.
- The main advantage of this method is that it allows the analyst to perform work measurements, as the observation is done where the system will be deployed. He initially gets an understanding of the system, the organisational culture and the workflow.
- Some requirements are apparent to stakeholders but they find it hard to verbalise; this is where the observation technique is preferred, as the verbal communication becomes helpless in this case.
- If the customer finds it hard to explain his requirement consciously, observation is done to find it which they know unconsciously.
- This method is best applied to quantitative and statistical analysis. Observation technique verifies the requirements and it delivers additional instant requirements worthy of consideration for bringing updates.

4.3 Stakeholder Requirements

Stakeholders	Features	Functionality
CUSTOMERS	• Simple UI • Monitoring of Daily Activities. • Tracking Sleep Hours. • Suggesting Food diet.	• More Interactive AI Chatbot • Customized Health Care • Notification about upcoming events and schedule • Seamless Integration between devices
COMMUNITIES	• Sharing their Fitness score. • Comparing Friend's scores. • Socializing with their group.	• Overall Improvement in Mental and Physical wellness. • Statistics of Fitness Tracking System.
PARTNERS	• Profit-Sharing • Accountability	• Collaborative Idea Sharing
SUPPLIERS	• Software tools Management • Placing an order for Software Tools	• Real-time Tracking of stocks • Automated Order placement on a scheduled time
GOVERNMENT	• Abide by Laws, Regulations and Standards	• Privileged access to user data when required
ORGANIZATION	• Collaboration with existing Fitness Organisation • Encourage Doctors, Physiatrist to suggest this product	• Reward-based system for Gyms and Fitness centres • Consolidated Annual Returns
SOCIAL MEDIA	• Advertising the Products • Product Campaign	• Customized ad for different Age, Gender, Culture • Fun Events for promoting the product
SHAREHOLDER	• Profit and Share Return Details	• Periodic Financial Reporting
BOARD MEMBERS	• Policy and Decision Making	• Private and Secured Chat Room exclusive for board members

INVESTORS	• Rate of return and Market shares • Stock Market Activity	• Portal to share views and market status
DEVELOPERS	• Real-Time Application Status Monitoring	• Feedback and Bug-Report from Beta-Testers
MANAGERS	• Realtime Sales Forecast • Real-time Risk Accessibility & Insight • Flexible Project Budget Monitoring	• Automated Budget Control and Planning
OWNERS	• Generate Daily Sales-Report	• A monthly report stating the reasons for lost customers
CREDITORS	• Periodic loan repayment	• Permission to Inspect Project's Performance, Financial condition, Payables and Possessions

4.4 Requirement Prioritization

Requirement prioritization is employed in software package management for determining which functionalities of a software package should be included during a certain release. Requirements also are prioritized to reduce risk during development so that the foremost important or high-risk requirements are implemented first. There are various methods to prioritize requirements. Some of these methods work best on projects with small requirements while others are suited for complex projects with many decision-makers and variables. This list of requirements prioritization techniques provides a summary of common techniques which will be utilized in prioritizing requirements.

1. **Ranking** In this method the requirements are given ranks based on their importance.

2. **Numerical Assignment (grouping)** In this method requirements are sorted into different priority groups with each group representing something stakeholders can relate to. For example, critical or high priority, moderate or medium priority and optional or low priority, compulsory, vital, rather important, not important, and doesn't matter to explain their importance.The definition of these groups must be made clear to the stakeholders for better understanding of requirements.

3. **MoScoW Technique** Four priority groups: MUST have, SHOULD have, COULD have, and WON'T have are used in this technique.
    - MUST : All Mandatory requirements are grouped here.
    - SHOULD : All high priority requirements are grouped here.
    - COULD : All features that are preferred but not necessary are
    - grouped here.
    - WOULD : All future developments are grouped here.
4. **Bubble Sort Technique** In this method two requirements are compared and one is given a priority over the other. This process is repeated until the requirement is correctly sorted.
5. **Hundred Dollar Method** In this method all stakeholders get a conceptual 100 dollars, which they will distribute among the wants.The priority is given based on the points each requirement receives. In the end, the total is counted and the requirements are sorted based on the number of points received.

From the lists of techniques discussed, we have chosen to prioritize our requirements based on moScoW Technique.

4.5 Requirement List

- **MUST**
    - Precise measure of physical activity like steps walked
    - Accurate timers for measuring the duration of physical exercise
    - Have controls on the device for restricting the social media usage
    - Monitoring of Daily Activities.
    - Advertising the Products
    - Tracking Sleep Hours
    - Generate Daily Sales-Report
    - More Interactive AI Chatbot
    - Suggesting Food diet.
    - Seamless Integration between devices

- Realtime Sales Forecast

- **SHOULD**
  - Placing an order for software testing tools
  - Calculating the calories burnt per minute of physical activity
  - Customized Health Care
  - Statistics of Fitness Tracking System.
  - Sharing their Fitness score.
  - Product Campaign
  - Periodic Financial Reporting
  - Comparing others' scores.
  - Socializing with their group.
  - Encourage Doctors, Physiatrist to suggest this product
- **WOULD**
  - Software tools Management
  - Rate of return and Market shares
  - Notification about upcoming events and schedule
  - Overall Improvement in Mental and Physical wellness
  - Customized ad for different Age, Gender, Culture
  - Fun Events for promoting the product
  - Feedback portal to share views
  - A monthly report stating the reasons for lost customers
  - Private and Secured Chat Room exclusive for board members
- **COULD**
  - Collaboration with existing Fitness Organisation
  - Automated Order placement on a scheduled time
  - Reward-based system for Gyms and Fitness centres
  - Privileged access to user data when required

Chapter 5

Requirements Management

5.1 Functional Requirements

Functional Requirements (FR) specifies the Input , output and the actions that Must be performed by the system. These requirements define the system and are to be implemented mandatorily for proper functioning of the system.
Functional Requirements are classified into 4 major categories

5.1.1 Business Requirements

They are solution independent requirements containing the product objectives and goals that are to be met.

- Realtime Sales Forecast
- Analytics of the capital received through Ads and from other revenue streams.
- Automated Budget Control and Planning

5.1.2 User Requirements

They contain the needs and wants of the system that they are gonna use.

- Impose restrictions on his device inorder to limit his digital intake
- Tracking Sleep Hours
- Suggest food diet
- Monitoring of Daily Activities like steps walked
- Intuitive graphical representation of the collected data
- Seamless Integration between devices

- Sharing their Fitness results to other people and also to social media
- To have an interactive AI Chatbot for 24/7 support
- Effortless import / export of data while changing devices.

5.1.3 System Requirements

These include the software and hardware specifications, system responses, or system actions that are performed. Our system is basically an application software, thus it requires a smartphone with the appropriate sensors or a fitness tracker for enhanced accuracy of the results.

- Platform compatibility (Android / IOS)
- Store and retrieve data from database
- Reminders to keep the user in track
- Have controls on the device for restricting the social media usage
- Collect and Analyse data from the Fitness Tracker / Sensors of the device

5.1.4 Administrative Functions

This includes the periodic functions that the system does for administrative purposes.

- Generate Daily Sales-Report
- Real-Time Application Status Monitoring
- Get Feedback and Bug-Report from Beta-Testers

5.2 Non Functional Requirements

Non-functional requirements (NFR) specifies the standards that are used to decide the operation of a system apart from specific behaviours. The NFR utmost focuses on the performance and throughput of the system. Some of the non-functional requirements of the system are listed below

Robustness Robustness is the ability of a computing system to deal with errors during execution and it also deals with erroneous input.

Usability Usability is often described as the ability of a system to deliver an environment for its users to carry out their activities safely, effectively, and effortlessly without compromising the user experience.

Serviceability Serviceability a deployed system is regularly maintained, inclusive of tasks like monitoring the system, solving problems that arise, including and offloading users from the system.

Stability Stability Testing checks the firmness and rigidity of the software in different situations. It focuses on the time to failure of the system.

Manageability Manageability focuses on users point of view about how smartly the system can be maintained and monitored.

Recoverability Recoverability is how swift the system could be rolled back or restored to its healthy running state, after it has gone through a system crash or a hardware failure. Recovery testing pushes the system beyond its limit to try breaking it and calculates the time taken for recovery.

Security Cybersecurity is the protection of computer systems and networks from unauthorized users so as to offer confidentiality, integrity, and availability (CIA).

Data Integrity Integrity focuses on preserving the consistency and accuracy of data over its whole life cycle. Data must not be altered in transit, while it is sent over the Internet. Certain measures need to be taken to make sure that no unauthorized individual or subject makes any modifications to our data. Integrity is an essential element with regards to the design, implementation, and utilization of any system that stores, retrieves, or processes the data.

Capacity Channel capacity is the transfer rate at which information can be transmitted over a communication medium reliably. Capacity is delivering enough functionality required for the end users

Availability The availability of a system is generally calculated as a characteristic of its reliability, maintainability, and its redundancy. As time is taken for maintenance decreases, the supply increases. Availability is about preserving the enterprise operations up and running, firewalls, proxies, computer systems and the whole lot must be up and running 24 by 7, 365 days.

Scalability In order to handle the increased amount of user data and also the added resources while expanding the company, Scalability criteria should be taken into account.

Interoperability Interoperability - Interoperability is one such requirement of a system, whose interfaces are absolutely understood, to work alongside various other systems without imposing any limitations to access or modify information across devices at present and also in the upcoming years.

Reliability Reliability describes the ability of a system or any component to function without any failures or defects for a specific period of time as promised.

Maintainability maintainability is the ease of maintenance of a product to prevent unexpected working conditions, to replace and repair the faulty components without replacing the components in good condition, and to correct the defects and the cause of them.

Environmental It is the practice of protecting our surrounding environment. Usually brought into force by individuals, governments and some non-profit organisations. They aim at reversing the trends, conserving the environment and making the existing natural resources available.

5.3 System Features

Features are the "tools" you use within a system to complete a set of tasks or actions. It is a unit of functionality of a software system that satisfies a requirement, represents a design decision, and provides a potential configuration option. Some of the most essential features of the system are mentioned below,

5.3.1 Monitoring Daily Activities

This feature assists you to stay track of your own physical health and lifestyle behaviour this is often one among the essential features of the merchandise . It helps the user in monitoring and tracking fitness related activities like distance walked or run, calorie consumption, and heartbeat. This will be integrated together with your smartphone to see the information collected from the device and present it in an intelligible and informative way. The information collected from the devices are often analysed and used to create a customized healthcare tailored and consistent with the user's lifestyle with daily routines, activities and fitness goals to realize . There are various customized healthcare options for all age groups, gender and culture.

5.3.2 Tracking Sleep Hours

Sleep may be a vital but often neglected, component of everyone's overall health and well-being. Sleep is vital because it helps the body to repair itself and be fit and prepared for an additional day. These devices are used to measure the sleep duration of the users and to measure quality of sleep and awaken users from light sleep, potentially improving overall sleep. Most of the devices utilize data generated from in-built accelerometers to work out sleep parameters.

5.3.3 Suggesting Food diet

With the facility of AI, the appliance also becomes smarter day by day to such an extent that it'll automatically start advising the entire set of effective newer multiple diet plans that best suit the user supported the gathering of knowledge gathered in weeks or months from the tracking device. It considers the behaviour and health of the user, aside from other details within the data that it synthesises. AI helps the users to get new things to undertake and decide their diet plan.

5.3.4 Sharing Fitness score

This brings new opportunities to influence physical activity by encouraging users to trace and share physical activity data and compete against their peers. And it shows the social processes that conciliate the connection between the utilization of wearable fitness trackers and intention to exercise. The results suggest that the ways during which exercise data are shared significantly influence the exercise intentions, and these intentions are conciliated by individuals' evaluation of exercise, belief about important others' approval of exercise, and perceived control upon exercise. By using Streak point and reward system, the user is very motivated to maintain their streak and compete with their social friends.

5.3.5 Interactive AI Chatbot

Chatbots are computer programs designed to hold a dialogue with people, assisting them via text messages, applications, or instant messaging. Essentially, rather than having a conversation with an individual , the user talks with a bot that's powered by basic rules or AI . Chatbots are already widely occupied to support, expedite, and improve processes in other industries, like retail, and now, the technology is gaining traction in healthcare and fitness. These chatbots make the exercising sessions more

fun and interactive by motivating the users to achieve their fitness goals. An AI chatbot can assist you stay loyal to your fitness workout plan.

Chapter 6

System Design

6.1 Use Case Diagram

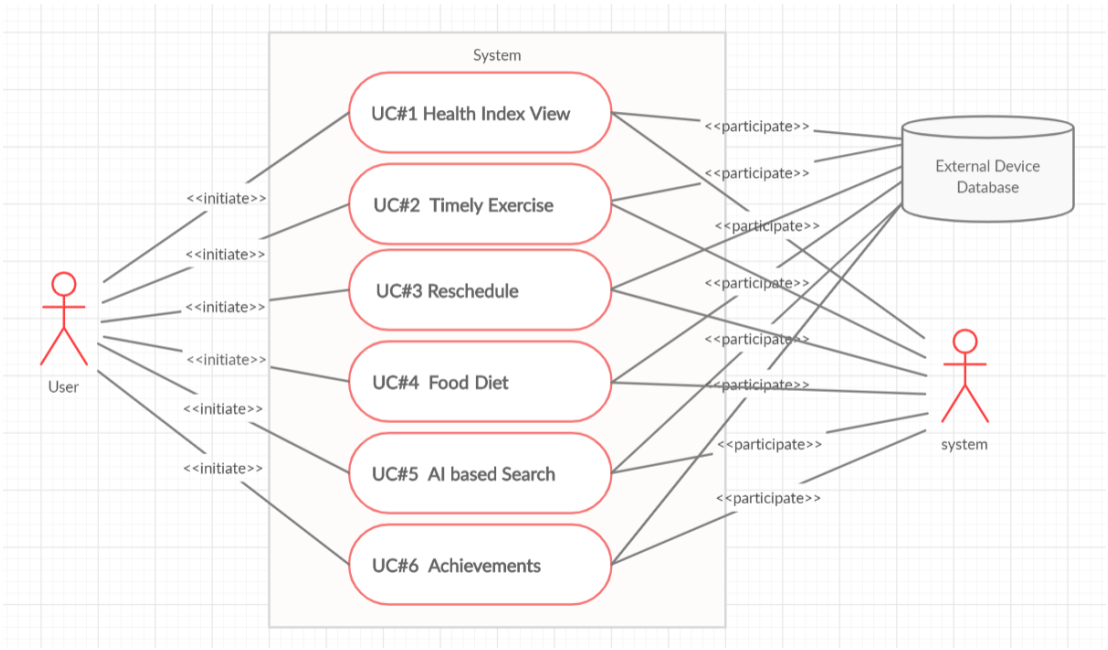
1. **Description**

   - **UC#1 Health Index View**
     The user wants to see his or her health index based on their daily activity. This shows some data like calories burnt, blood pressure rate and time of exercise. Users can also view his or her past health index which motivates them to do more exercise and be healthy. The application collects those information from the external devices connected like fitbit and that will be displayed in the form of a graph or a chart. If the user takes up combined fitness activities, they can also view other users health index who are in association with the combined fitness activities.
   - **UC#2 Timely Exercise**
     The user can fix their free time and the list of exercises they want to do. At the allotted time, the system locks the device in which the application is installed. This helps users to finish the task without deviations.
   - **UC#3 Reschedule**
     In case of any emergency, the system allows the user to reschedule. This makes the application a user friendly app! The user can reschedule only once at a day. Even though it is user friendly, some restrictions make the user show more involvement towards their physical fitness.
   - **UC#4 Food Diet**
     The user is allowed to schedule time and fix exercises of their own. Based on the list, AI suggests a food diet plan to be followed by the user which leads them towards more fitness. It is the user's wish to follow.
   - **UC#5 AI based Search**

Users can look up for the health information for a reason. AI is much used here. It helps users to get exactly what they are looking for. Chatbot provided here helps the user to clarify their health related doubts realtime.

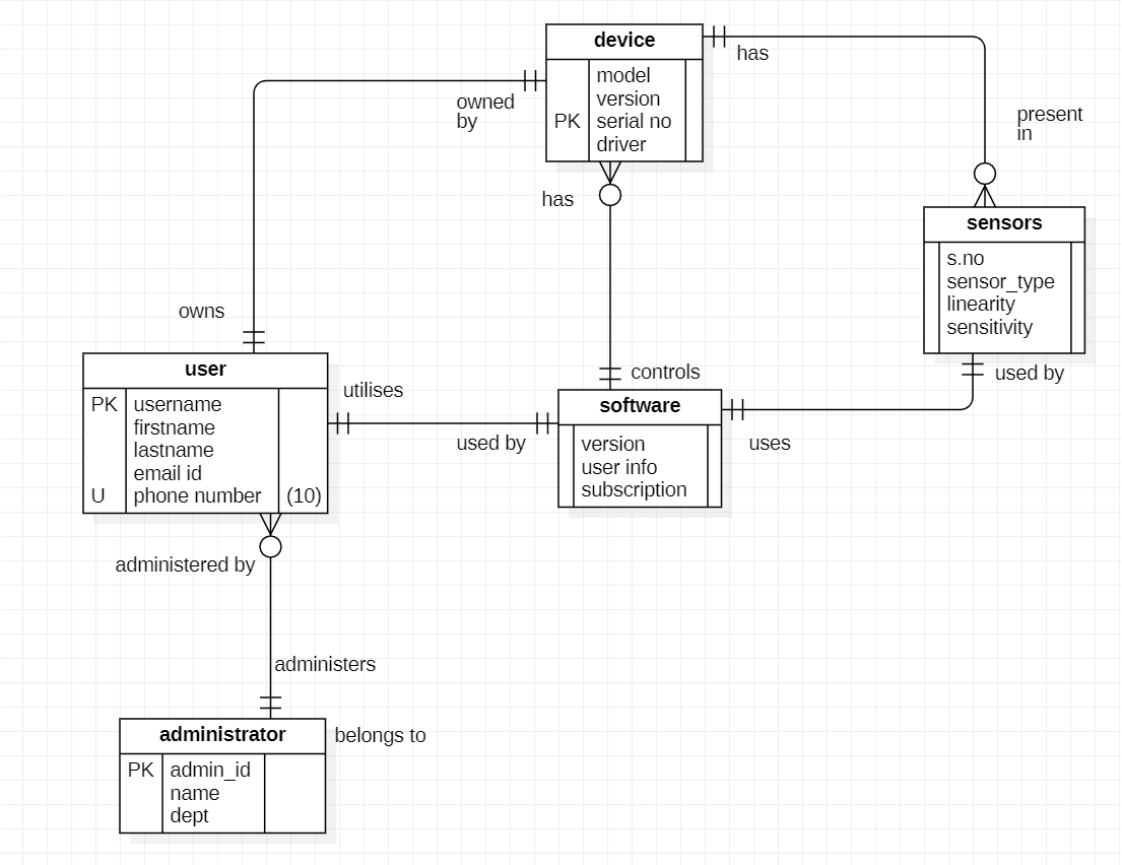
- **UC#6 Achievements**
  There is a separate column called achievements where the user can view their improvements based on the monthly activities they perform. The user can also view other user's achievements in their locality. This motivates them towards their physical fitness and thus our goal is achieved.

2. **Diagram**



6.2 Arichitecture Diagram

6.2.1 Entity Relationship Diagram



6.2.2 Relationship

1. OWNS/OWNED BY: the user owns the device; the device is owned by the user.
2. UTILISES/USED BY: the user utilises the software, the software is utilised by the user.
3. ADMINISTERED BY/ADMINISTERS: user and his details are administered by admin
4. USES/USED BY: software makes use of the sensors for reading the movements/activities of the user; also records the time.
5. PRESENT IN/HAS: the sensors are present in the device; the device has sensors
6. CONTROLS: the software gets the readings from the sensors of the device and it controls the device

Chapter 7

Requirement Tools

7.1 Requirement Management Tools

Requirement analysis and gathering requirements are the starting steps in any kind of software development. The ability to manage changing requirements throughout the life cycle of software development is also necessary to create a successful solution for any kind of problem statement. Efficient requirement management tools help in maintaining a clear statement about the requirements along with the attribute and traceability to other needs of the project. The requirements tool should keep everyone involved in the project such as the end-users, project stakeholders, developers, project managers, and testers in the same loop on the status of the requirements and have a deep understanding of the changing needs, especially for scheduling, functionality and expenses. Using such tools the project objectives and deliverables are shared by various team members such as customers, analysts, Software Architects and designers for collaborating and managing requirements locally or globally. Additionally, it also makes sure that all developers are operating from the same point irrespective of their location and without any expensive last-minute surprises. Thus the outcome of using the requirements management tool is a high-end application that matches what the end-user expected with all the internal and external requirements. The requirements management tools should have the following features:

Development methodologies Requirements management tool must be flexible and support different types of software development methodologies.

Organization The tool should have the feature to organize the requirements in a hierarchy and break down the necessary requirements into smaller sub-items and classify the list accurately.

Visualisation It should have the tools to generate graphical diagrams, reports, flowcharts, simulations, storyboards and graphical models like UML diagrams.

Traceability The tool should have the ability to link functional requirements

to test cases, design specification and ensure that no functionality is missed during the testing phase. Thus the tool should have the Feature to find the origin of each requirement.

Collaboration The tool must help the team members to collaborate and work with the other members efficiently and have the features of commenting and sharing work so that time is saved and productivity is increased.

Integration The requirements management tool has the ability to allow users to import documents from other resources and integrate with them smoothly.

Security It should have the ability to give permission for role-based access control for classified information and manage other security concerns.

After looking at some of the available requirements management tools in the market we decided that CALIBER is a more suitable tool for our problem statement. With Caliber we can manage and visualize requirements, Increase efficiency and improve collaboration. It offers the following features:

1. The requirements can be defined in our own preferred format and have the additional benefit of a centralized database.

2. The requirements can be listed using hierarchies and traceability to reflect relationships and priorities.

3. The listed requirements can be represented by functional wireframes or simulations.

4. It allows us to capture business and process flow using steps, decisions, swimlanes, and actors using its unique storyboard feature.

5. A quick mock-up working application can be created using wireframing and logic controls which allows us to capture the process flows, steps, decisions, screens, and custom logic of the application and compare it with the requirements.

6. The review feature in caliber provides an intuitive interface for all stakeholders to view or discuss defined requirements and visualizations.

7. Requirements can be traced and made clear of impacts to previous changes in caliber.

8. For effective collaboration, it has the feature to track threaded discussions pertaining to a requirement, scenario, or simulation element.

9. It can automatically generate test cases using previously created scenarios that cover all unique functional flows throughout the system.

Chapter 8

Conclusion

8.1 Conclusion

Requirements thus play a vital role in the development and performance of any project. It ensures the value and quality of the project and helps in better understanding of the end-users needs. Thus requirements management help in Understanding the goal, Estimating project costs, prioritizing requirements and creating a development schedule.